

WHAT IS CLAIMED IS:

1. A sheet set apparatus for sealing preparation, which performs sealing preparation of a photovoltaic portion disposed on one surface of a substrate, and
5 a pair of lead wires connected to the portion and having one-end portions forming output lead wires, said apparatus comprising:

10 a sheet supply section which is disposed along a transport way for transporting said substrate with said one surface facing upwards, while said output lead wires remain disposed at an upstream position with respect to a transport direction, and which feeds a sheet from a roll;

15 a sheet cutting section which cuts a sealing sheet to be set on said substrate from a fed portion of said sheet; and

20 a sheet set section which comprises a transfer head of a vacuum suction type having a plurality of suction holes formed in a lower surface thereof, a head moving device to reciprocate/move the head over a sheet receiving position in said sheet cutting section and a sheet covering position in said transport way, and a head elevating device to raise/lower said transfer head in both said positions, and in which the transfer head
25 attracts said sealing sheet from above at said sheet receiving position and stops attracting said sheet when the head reaches said sheet covering position.

2. The sheet set apparatus for the sealing preparation according to claim 1, wherein a size of said transfer head is not smaller than a size of said sealing sheet, a wall of said transfer head has a flat 5 surface, and said suction holes are formed over a range which is equal to the size of said sealing sheet in the wall.

3. An output lead wire set apparatus for sealing preparation, which performs sealing preparation of 10 a photovoltaic portion disposed on one surface of a substrate, and a pair of lead wires connected to the portion and having one-end portions forming output lead wires, said apparatus comprising:

15 a pair of first bend guide sections which are disposed on opposite sides of a width direction of a transport way for transporting said substrate with said one surface facing upwards, while said output lead wires remain disposed at an upstream position with respect to a transport direction, which include a first 20 guide plate as a reference for bending said output lead wires, and which reciprocate/move the guide plate over a use position intersecting said lead wires on said transport way and a retreat position out of said transport way;

25 a pair of second bend guide sections which include a second guide plate able to three-dimensionally move, and which reciprocate/move said second guide plate over

a first press position of one side portion of said second guide plate intersecting a root portion of said output lead wire bent using said first guide plate as the reference, and a second press position of the other
5 side portion of said second guide plate intersecting a middle portion of said output lead wire bent on a side of a central portion of a width direction of said substrate using the one side portion of said second guide plate as the reference; and
10 a wire drawing robot which includes a drawing chuck to pinch said output lead wire and able to three-dimensionally move, and which draws around the chuck, bends said output lead wire using said first guide plate as the reference, bends said output lead wire using the one side portion of said second guide plate as the reference, and bends said output lead wire using the other side portion of said second guide plate as the reference.
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4. The output lead wire set apparatus for the
20 sealing preparation according to claim 3, wherein a press mechanism is disposed on said transport way, and the mechanism includes an elevatable press member which presses and folds a first bent portion of said output lead wire formed using said first guide plate as the reference, and a second bent portion of said output
25 lead wire formed using the one side portion of said second guide plate as the reference toward said

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substrate.

5. A sheet set apparatus for sealing preparation, which performs sealing preparation of a photovoltaic portion disposed on one surface of a substrate, and
5 a pair of lead wires connected to the portion and having one end portions forming output lead wires, said apparatus comprising:

a sheet supply section which is disposed along
10 a transport way for transporting said substrate with
said one surface facing upwards, while said output lead
wires disposed at an upstream position with respect to
a transport remains direction, and which feeds a sheet
from a roll;

15 a sheet cutting section including a cutting
mechanism which cuts a sealing sheet having a wire
passing portion with said output lead wire passed
therethrough and to be set on said substrate from a fed
portion of said sheet;

20 a sheet set section which comprises a transfer
head of a vacuum suction type having a plurality of
suction holes formed on a lower surface thereof, a head
moving device to reciprocate/move the head over a sheet
receiving position in said sheet cutting section and a
sheet covering position in said transport way, and a
25 head elevating device to raise/lower said transfer head
in both said positions, and in which the transfer head
attracts said sealing sheet from above at said sheet

receiving position and stops attracting said sheet when said head reaches said sheet covering position; and

a wire support section which includes a support chuck able to pinch a lower portion of an upward bent portion of said output lead wire, and reciprocates/moves the chuck over a pinching position for pinching said upward portion and a retreat position out of said transport way.

6. The sheet set apparatus for the sealing preparation according to claim 5, wherein a size of said transfer head is not smaller than a size of said sealing sheet, a wall of said transfer head has a flat surface, and said suction holes are formed over a range which is equal to the size of said sealing sheet in the wall.

7. The sheet set apparatus for the sealing preparation according to claim 5, wherein said wire support section includes a support chuck which can move in a direction attached to/detached from said upward portion and a vertical direction, pinches an upper portion of said upward portion passed through said wire passing portion in a raised position, and pinches a lower portion of said upward portion in a lowered position, and a concave portion escaping from said support chuck is disposed in said transfer head.

8. The sheet set apparatus for the sealing preparation according to claim 5, wherein said wire

support section includes an upper support chuck which can move in a direction attached to/detached from said upward portion and can pinch an upper portion of said upward portion passed through said wire passing
5 portion, and a lower support chuck which can move in the direction attached to/detached from said upward portion and can pinch a lower portion of said upward portion, and a concave portion escaping from said support chuck is disposed in said transfer head.

10 9. A sealing preparation apparatus which performs sealing preparation of a photovoltaic portion disposed on one surface of a substrate, and a pair of lead wires connected to the portion and having one end portions forming output lead wires, said apparatus comprising:

15 a transport way to transport said substrate with said one surface faces upwards, while said output lead wires are remains disposed at an upstream position with respect to a transport direction;

20 a first sheet set apparatus which includes a first transfer head of a vacuum suction type, which is disposed along said transport way, which cuts a first sealing sheet from a fed portion of a first sheet wound in a roll shape, and in which the first transport head attracts and transports the sealing sheet, and stops attracting the sealing sheet on said transport way, and the sealing sheet covers said substrate;

25 a second sheet set apparatus which is disposed

on a downstream side from the first sheet set apparatus
in the transport direction, and which cuts a second
sealing sheet from a fed portion of an electrically
insulating second sheet wound in the roll shape, and
5 covers said first sealing sheet with the second sealing
sheet on said transport way;

an output lead wire set apparatus which is
disposed at the downstream position with respect to the
second sheet set apparatus in the transport direction,
10 and which comprises a pair of first bend guide sections
including a first guide plate as a reference for
bending said output lead wires, a pair of second bend
guide sections including a second guide plate having
one side portion as a reference for bending said output
15 lead wires bent on a side of a central portion of
a width direction of said substrate using said first
guide plate as the reference and the other side portion
as the reference for bending upwards said output lead
wires bent using the one side portion as the reference,
20 and a drawing robot including a drawing chuck to pinch
said output lead wire and three-dimensionally move;

a third sheet set apparatus which comprises
a third transfer head of the vacuum suction type, which
is disposed at the downstream position with respect to
25 said output lead wire set apparatus in the transport
direction, and which cuts a third sealing sheet having
a first wire passing portion from a fed portion of

a third sheet wound in the roll shape, and in which the
third transfer head attracts and transports said third
sealing sheet and stops attracting said the third
sealing sheet on said transport way, and the third
5 sealing sheet covers said second sealing sheet so as
to pass said upward portion through said first wire
passing portion; and

a fourth sheet set apparatus which comprises
a fourth transfer head of the vacuum suction type,
10 which is disposed at the downstream position with
respect to said third sheet set apparatus in the
transport direction, and which cuts a fourth sealing
sheet having a second wire passing portion from a fed
portion of a fourth sheet wound in the roll shape, and
15 in which the forth transfer head attracts and
transports the fourth sealing sheet and stops
attracting said the forth sealing sheet on said
transport way, and the forth sealing sheet covers said
second and third sealing sheets on said substrate with
20 said fourth sealing sheet so as to pass said upward
portion through said second wire passing portion.

10. The sealing preparation apparatus according
to claim 9, wherein said first sheet set apparatus
comprises:

25 a sheet supply section which is disposed along the
transport way for transporting said substrate with said
one surface facing upwards, while of said output lead

wires remain disposed at the upstream position with respect to the transport direction, and which feeds the sheet from the roll;

5 a sheet cutting section which cuts said first sealing sheet to be set on said substrate from the fed portion of said sheet; and

10 a sheet set section which comprises said first transfer head of the vacuum suction type with a plurality of suction holes formed in a lower surface thereof, a head moving device to reciprocate/move the head over a sheet receiving position in said sheet cutting section and a sheet covering position in said transport way, and a head elevating device to raise/lower said first transfer head in both said positions, 15 and in which the transfer head attracts said first sealing sheet from above at said sheet receiving position and stops attracting said sheet when said head reaches said sheet covering position.

11. The sealing preparation apparatus according to
20 claim 9, wherein sizes of said first, third, and fourth transfer heads are not smaller than sizes of said first, third, and fourth sealing sheets to be attracted to the transfer heads, walls of said first, third, and fourth transfer heads have flat surfaces, and said attracting holes are formed over a range which is equal 25 to the sizes of said first, third, and fourth sealing sheets in the walls.

12. The sealing preparation apparatus according to
claim 9, wherein said output lead wire set apparatus
comprises:

a pair of said first bend guide sections which are
5 disposed on opposite sides of a width direction of said
transport way, which include said first guide plate as
a reference for bending said output lead wires, and
which reciprocate/move the guide plate over a use
position intersecting said lead wires on said transport
way and a retreat position out of said transport way;

10 a pair of said second bend guide sections which
include said second guide plate able to three-
dimensionally move, and which reciprocate/move said
second guide plate over a first press position of one
15 side portion of said second guide plate intersecting a
root portion of said output lead wire bent using said
first guide plate as the reference, and a second press
position of the other side portion of said second guide
plate intersecting a middle portion of said output lead
20 wire bent on a side of a central portion of the width
direction of said substrate using the one side portion
of said second guide plate; and

25 said wire drawing robot which includes said
drawing chuck to pinch said output lead wire and to
be able to three-dimensionally move, and which draws
around the chuck, bends said output lead wire using
said first guide plate as the reference, bends said

output lead wire using the one side portion of said second guide plate as the reference, and bends said output lead wire using the other side portion of said second guide plate as the reference.

5 13. The sealing preparation apparatus according to claim 9, wherein a press mechanism is disposed on said transport way, and the mechanism includes an elevatable press member which presses a first bent portion of said output lead wire formed using said first guide plate as the reference, and a second bent portion of said output lead wire formed using the one side portion of said second guide plate as the reference toward said substrate.
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14. The sealing preparation apparatus according to claim 9, wherein said third sheet set apparatus and said fourth sheet set apparatus comprises:

15 a sheet supply section which is disposed along a transport way for transporting said substrate with said one surface facing upwards, while said output lead wires remain disposed at an upstream position with respect to a transport direction, and which feeds a sheet from a roll;

20 a sheet cutting section including a cutting mechanism which cuts a sealing sheet having a wire passing portion with said output lead wire passed therethrough and to be set on said substrate from a fed portion of said sheet;
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a sheet set section which comprises a transfer head of a vacuum suction type having a plurality of suction holes formed in a lower surface thereof, a head moving device to reciprocate/move the head over a sheet receiving position in said sheet cutting section and a sheet covering position in said transport way, and a head elevating device to raise/lower said transfer head in said both positions, and in which transfer head attracts said sealing sheet from above at said sheet receiving position, and stops attracting said sheet when the head reaches said sheet covering position; and
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a wire support section which includes a support chuck able to pinch a lower portion of an upward bent portion of said output lead wire, and which reciprocates/moves the chuck over a pinching position for pinching said upward portion and a retreat position out of said transport way.

15. The sealing preparation apparatus according to claim 14, wherein said wire support section includes
20 a support chuck which can move in a direction attached to/detached from said upward portion and a vertical direction, pinches an upper portion of said upward portion passed through said wire passing portion in a raised position, and pinches a lower portion of said upward portion in a lowered position, and a concave portion escaping from said support chuck is disposed in
25 said transfer head.

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16. The sealing preparation apparatus according
to claim 14, wherein said wire support section includes
an upper support chuck which can move in a direction
attached to/detached from said upward portion and can
5 pinch an upper portion of said upward portion passed
through said wire passing portion, and a lower support
chuck which can move in the direction attached
to/detached from said upward portion and can pinch
a lower portion of said upward portion, and a concave
10 portion escaping from said support chuck is disposed in
said transfer head.

REFERENCE